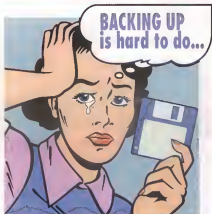


The

# COMPUTER PAPER

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## FROM THE EDITOR



This month, we are offering a change of pace with no excerpts from a new book by John Drenth. This excerpt from his new PC Crash Course and Survival Guide is a response to requests to offer simple, introductory information about computers for people new to computing. Plus a comment to friends seeking assistance in getting started. Randy Grace takes a look at the new crop of backup software, and offers some suggestions on bullet-proofing your business against hard disk crashes. Catherine Labrecque gets to the madison on purchasing a laser printer.

We have been through big changes at The Computer Paper this month. We have just completed the purchase of the Alberta edition of the paper from our former partners in Calgary. We welcome two new employees. Graeme Denner brings years of experience on a variety of computers to help out with editorial and desktop publishing tasks. Patricia MacGillivray has worked for the Alberta Research Council in the field of Artificial Intelligence, and has had experience in advertising, sales and events management. She is our new accounts manager for Alberta. We hope to be offering Alberta readers the most consistent good information that they are used to seeing in some interesting new formats. Our publication in Alberta reaches over 54,000 readers in Calgary and Edmonton, and has been a publication for over a year there. Our new Calgary office is 4th Floor, 714 1st St. SE, Calgary, T2C 2G8 with the same phone number 403/252-5757.

Alberta readers may have noticed a change on our front cover last issue. Instead of the former "BC Edition", it read "Lower Mainland Edition". We began to merge readers this month in the BC edition of The Computer Paper. We printed two separate covers, the vast majority of them still said "BC Edition", so there, but a few were mixed with a \$1.95 price on them. As you can probably guess, this publication is an advertising supported paper. We can circulate it for free because our advertisers support our efforts through their advertising. We offer you something interesting to read, and you, the reader, buy the products you are presented in our papers in sufficient quantities to keep our steady advertisers happy with us in business.

We're a steadily supply of questions for the publication from out-of-town readers and distributors. Our policy initially was fairly open — give the word and send give it to all who asked. The paper has been very successful. It gets picked up at grant conventions. In fact, most months we have less than a 3% return rate of copies to pickup when we go back out to distribute the next edition.

This return has brought us new problems however. We are now sending more papers to circulate, and we don't have more. We plan to make an increase for the fall, but we did not want to make one at the generally slower summer months. One obvious place to look was at our out-of-town circulation. We decided to try to sell out-of-town publications. We printed a number of these papers with the price tag of \$1.95. We will give this new "edition" a few months trial run. It is a test with immediate response, then we will be able to offer very effective circulation through our BC.

We apologize to those readers outside our main business areas, and we will no longer be able to provide the edition for them outside our own direct distribution areas. We hope that you think it is still worthwhile to pick it up and read, even at the rate (and we hope reasonable) price. If you are a retail outlet who interested in carrying copies of The Computer Paper, please call our circulation manager at 604/755-5296.

Enjoy the news.

Patricia MacGillivray  
Editor/Publisher

## Coming Editorial Schedule

1990	BC/NEWFOUNDLAND	1990	1991	CANADA WIDE
August 1990	July 31	Networking	July 14	July 18
September 1990	August 31	Computer Training	August 15	August 17
October 1990	September 28	GIT and Accounting	September 14	September 28
November 1990	October 28	Presentations Graphics	October 17	October 19
December 1990	November 28	Christmas News	November 14	No reader 20
January 1991	December 28/29nd	Power & Connectivity	December 12	December 14



# WHAT'S NEW

## RICOH OFFERS ADD-ON TO MAKE STANDARD FAX-A-PC SCANNER

CHICAGO, ILLINOIS, U.S.A., 1990 JUN 4 (NII) — Ricoh has announced its FAX-A-PC add-on to the scanner. This add-on is available for Microsoft Windows. An MS-DOS version will ship in two months and the Macintosh version will be available in July.

The system consists of a \$799.45 personal hardware unit and a \$175 software package. The system is currently available for Microsoft Windows. An MS-DOS version will ship in two months and the Macintosh version will be available in July.

With this system, users can scan single pages into their fax and transfer the image to their computer. PC versions include 10x14, a graphics file conversion program. The Macintosh user can request an file conversion. The FAX-A-PC will allow users to transmit data via fax. The system will let the fax serve as a printer. The FAX-A-PC will work with a Group Three fax. It can use the computer's memory for background for applications (including image processing and storage of compressed data).

Ricoh Corporation is based in West Caldwell, N.J.

(David Feldman / 19900604/Press Contact: Mark Stanton, Ricoh Corporation, 501-992-2000)



## OGIVAK ROLLS OUT WORKSTATION/LAPTOP

MONTREAL, Canadian computer vendor, Ogivak Technologies, has launched Interport, a 586-based workstation with detachable laptop unit. Interport is available in 586SX (20MHz, with an 256 disk) or in 586i586 (33MHz) with an EISA slot configuration. The link between the 586 laptop and desktop units is wireless, requiring only one motion to activate them. The Interport 246 laptop's ability to link to any Interport System desktop unit without special setup routine is designed for multiple stations/other operations.

Contact: Ogivak Technologies Inc., Suite 500 601 W. Hastings, Vancouver, B.C. V6S 1A6 (604) 684-5278

## CHARACTERS

### Characters

characters  
writing

#### THE STROKE OF A PEN

THEODORE HIGHTS, N.Y. IBM research has been advancing a leading edge of computer-based character recognition by approaching the problem of how to recognize letters from a new perspective. Their experimental system, called Paperlike Interface, employs a stylus and tablet to record handwritten text. Without conventional OCR software rules trained information and computers detect groups of strokes, or characters, with varying emphasis to "recognize" them. Paperlike Interface recognizes the individual strokes allowing recognition of characters that run diagonally or even overlap. The research effort has a significant computer recognition of cursive writing. Just as work is being done in voice recognition where a computer is programmed to respond only to one person's voice patterns, IBM's research promises a similar breakthrough for recognition of handwriting's writing style. Beyond that horizon appears the potential for recognition of scientific or musical notation, even text-on-images.

Contact: IBM Research Division, Yorktown Heights, N.Y. (914) 945-1285

#### HIGH TECH WHO'S WHO

Companies interested in a free listing in the annual computer industry guide Northwest High Tech should act now. The publisher, Revolution Business Press, will mail out detailed questionnaires over the next weeks to gather information for company profiles. These will be published in the 1991 edition, scheduled to be released at the end of the year. More than 1,200 software, hardware, and sales/service related companies from Washington, Oregon, Idaho, British Columbia, and Alberta were included in this year's edition.

Companies not previously listed should contact: Revolution Business Press at 11300 N.E. Eighth St., Suite 206, Bellevue, Wa. 98004 (206) 463-4801

## WHAT'S OLD

LISA BUKIED IN LANDFILL CUPERTINO, CALIFORNIA, U.S.A., 1990 JUN 12 (NII) — Since 1,700 Lisa went to their graves in Utah after a decision was made to bury the computers rather than rebuild them. Apple initiated the decision in concert with Sun Microsystems, a Lotus 123 firm which supplies Lisa to the open-ended equivalent of Macintosh Plus.

The decision to bury the computers to the Lisa came after Sun could not meet Apple's price to buy the machines outright. Sun Microsystems, whose slogan is "the trading edge of high technology," bought about 4,000 Lisas and took 3,700 as compensation. When Sun paid back about 1,200 of the computers, the rest, 2,500, were carried by Apple Computer employees, to the local landfill.



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## COMDEX REPORT

### TOUR OF COMDEX SHOW FLOOR INDICATES MAJOR TRENDS

ATLANTA, GEORGIA, U.S.A., 180 JUN 5 (AP) — Some of the media criticized the Spring Comdex show for the lack of attendance by big-name firms like IBM and Microsoft, but a tour of the show floor found interesting trends in abundance.

Key ToolKit Corp. of Spokane, WA, best known for its keyboard, showed a prototype of its 3500X desktop computer. The box weighs under 5 pounds, has a full-size screen and keyboard, and runs on 80386. It includes an innovative "key mouse", which sits up the space of one key on the keyboard and can control a cursor on the screen. The two biggest keys to the "mouse" can be used as mouse buttons. The computer will be sold on an OEM (original equipment manufacturer) basis, meaning consumers will see it later this year with a variety of different managers. It may give Toshiba's Dynabook a run for its money.

Hewlett-Packard showed signs of challenging the Japanese giant on their own turf. The company exhibited comprehensive products in its market: the Japanese are used to dominating — printers,

storage devices, and laptop computers. They were massed among facing the nearby Sharp booth. Hewlett-Packard also demonstrated scanners and an reusable optical drive with 650 megabytes of capacity per disk, which is shipping now. "The rest of that drive comes from Sony," Jack Holliday of Hewlett-Packard told us, "but we're developing our own core." Hewlett-Packard is also taking on Microsoft with its New Wave operating system, which was displayed in the booth.

For the Japanese, meanwhile, it was business as usual. Panasonic showed its line of printers, plotters and PCs, but the biggest crowd in its booth was gathered around its compact disk drives, which won't ship until November. They read and write data up to 1 million bytes. Sharp presented color laptop technology in its booth, with a line which snaked the perimeter from the 6-pound 9300 to the 29-pound MultiColor 345, which sports a flat-panel 345 chip, an 80 megabyte hard drive and 1 megabyte of memory for about \$10,800. Still, larger crowds stood around a display of its TFT dual-flat color screen technology.

That TFT dual-flat color screen is everything it's cracked up to be, judging from crowd reactions to prototypes shown at the Comdex show. Hitachi, Sharp and Toshiba all exhibited the screens, which were more-than-just displayed intractably sharp colors, whatever used as computer screen, overhead projector or plain TV.

The Japanese are also becoming more aware of the U.S. market, and improving their fix product lines. Jeff Holliday of Hitachi said his company will introduce a high-capacity plotter paper for machines called Habitat at the National Office Machine Dealers Association show in Las Vegas next month. Holliday said the Habitat unit is "like having your own post office for national and international fax."

Two European companies were also making their presence felt as the U.S. computer market at this show. Olivetti was demonstrating a full-line of PCs as a result of the show floor, including a unit running the new Intel 80486 chip. Magnum, a division of N.V. Philips of Holland, made a big splash through its new Windows division, which is purchasing source this year. That unit introduced the 5500L, a \$2,700 PC which contains a CD-ROM player as well as a floppy drive, built 80586PC chip, an 80 complete hard drive, 2 megabytes of memory and VGA graphics. The CD-ROM drive, unfortunately, only conforms to the High Sierra text standard, and cannot run CD-ROM containing graphics.

### COMDEX SPRING: WORDPERFECT HOLDS BACK UPDATE

ATLANTA, GEORGIA, U.S.A., 180 JUN 4 (AP) — WordPerfect held planned to offer Version 5.0 of its



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WordPerfect Office program at this Spring Comdex, but decided to hold back owing to delays in producing the documentation. The package was promised for later this month, possibly in time for the PC Expo show in New York.

In addition, the company announced it will soon issue an update for its DrawPerfect program, which first shipped last March. Version 1.4 features a runtime module for the distribution of screen data shows, new presentation advance options, a "go to" screen which can help direct viewers to other slides, and other drawing features. The update will improve screen work and will run 3.5 for individuals and users who receive 1.0.

Responding to increased interest in Microsoft Windows since Version 3.0 was released last month, WordPerfect announced it will develop a version of its desktop word processor for Windows. In fact, it's developing a version for the Presentation Manager. This is a reversal of its earlier position, and a victory for Microsoft/IBM. "We see the light," said spokesman J. K. Adams, "and responded to our users." The company denied that delays in delivering Presentation Manager 3.0 were behind the decision.

Finally, Word Perfect discontinued its new "field jockey" feature on its customer support line. A disk jockey has been hired to answer the company's 800 support lines and will provide live, easy-to-understand answers to questions in live chat rooms on expert to text, depending on the nature of the query. Background music plays in the background, and the musician also reads ads for upcoming versions of WordPerfect products.

(Dave Blankenship/19900604/Press Contact: Kathryn Post-4-Sang-ent, WordPerfect, 811-222-0040)

**COMDEX SPRING: WINDOWS, 686 ARE MAJOR COMEX TRENDS**  
ATLANTA, GEORGIA, U.S.A., 1990 JUNE 4 (NE) — The two major trends noted at this Comdex show came from companies which aren't even exhibiting, Microsoft and Intel.

Microsoft's Windows 3.0, which finally shipped last last month, has brought excitement back to the PC platform. Exciting Windows developers, including Sevens, report great increases in speed and performance for their products on version 3.0, which breaks the 640K memory barrier. "Version 3.0 introduces Windows a viable platform," said Bill Jones of Sevens. "The enhanced memory addressability means applications can work faster, and take full advantage of the PC hardware." Major vendors of connectivity products like DataSolutions also pointed their software to Windows, and WordPerfect announced it will soon produce a Windows version of its flag-ship word processor ahead of its Presentation Manager version.

As for Intel, the promised 486 machines of last fall are now working all over the show (see *American Megatrends* of

Atlanta, Georgia displayed one unit which features the chip on a plug-in board. The motherboard contains a full 286 chip. "We think this is the highlight of the show," said one presenters John Morrison, who noted that if the 486 board boards, the 546 can still run with moderate loss in performance. Other 486 machines at the show include Olivetti, Acer, and Symantec/IntelligentAssociates of Chicago, which showed a 486 machine using the SIMA bus.

Perhaps the most interesting comments on the 486 came from Patrick Lee, vice president of Pioneer Computer, Fremont, California. "The latest growing out of the market for the Intel architecture, and Intel knows that," he told Newsbytes. Lee says Intel told him they will ramp up production of the 486 even if they have to sacrifice 286 production to do so.

**ANEW WAY TO LEARN TO PLAY THE PIANO**  
CHANDLER, CALIFORNIA, U.S.A., 1990 JUNE 2 (NE) — If you always wanted to learn to play the piano and were discouraged to be in a group and auto-tuned by a piano teacher, your golden opportunity may have arrived.

The Software Toolsmiths has introduced The Miracle Piano Teaching System that contains a special course for your Nintendo Entertainment System, an advanced electronic keyboard, a game-playing interface and artificial intelligence (AI) technology. The system takes people of any age through customized, intelligent piano lessons. According to the company, the system can have anyone playing one and two-handed melodies within hours.

The system uses a personalized work-study of 480, musical pieces and games (for adults and children) to teach piano technique fundamentals. Using AI, the system knows which key is being pressed and can make and identify trouble spots in note recognition, rhythm and fingering. As a student progresses, the system will offer to play one or both hands, slow the tempo, display the keys being pressed, add a metronome or even provide a full orchestral background to the exercise.

The keyboard can operate independently as well as with the system. The keyboard is full-sized and includes sustain and there is a foot pedal to enable sustaining of notes. The system comes equipped with stereo headphones for any players who want privacy and can be connected in a stereo system for those who like to perform for a larger audience.

Dudley Moore, the well-known comic actor who is shown as a completed pianist has been named official musical consultant for The Miracle Piano Teaching System and will appear in all the advertising scheduled to begin in the fall.

The Miracle Piano Teaching System costs the \$299.95.

(Janet Embrey/19900611/Press Contact: Deborah Brown, 19905 Interpress, 400-534-5040)



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## APPLE

### APPLE AND AMERICAN FILM INSTITUTE FORM PARTNERSHIP

CUPERTINO, CALIFORNIA, U.S.A., 1990 JUNE 12 (NS) — The American Film Institute (AFI) and Apple Computer will combine resources to integrate computer technology into the film and television community. Apple will donate over \$1 million in Macintosh equipment to the newly created AFI/Apple Computer Center for Film and Videomakers in Los Angeles.

Apple Chairman John Sculley, on hand for the announcement, said the center will help the film and television industries embrace the new technology, and the center will help the film and television industries embrace the new technology, and the center will help the film and television industries embrace the new technology.

The Center is also expected to help Apple in its development of multimedia applications for its Macintosh line.

Specifically, the center will feature a variety of Macintosh systems for demonstration, training, consultation, and research and development. The center will offer workshops that explore and integrate computer technology into all phases of the creation and production process. Workshop topics will include areas concerning production, directing, screenwriting, animation, editing, cinematography, production design, sound, and more editing.

Access to the center will be available to screenwriters, directors, producers, production designers, editors and all members of the filmmaking community.

Announcing the new relationship, AFI Director Jean Fritenberg explained: "Filmmaking is grounded in a rich tradition of combining creative vision and technical innovation. The Institute is dedicated to providing the resources of the future for filmmakers so that they continue to challenge the limits of creative technology. The AFI/Apple Center can play a significant role in improving the progress of art and science and promoting growth in the creative realm of film, television and video."

Contact: Emily Ladine, American Film Institute, 235.856.7000; Patsy Tullio, Apple, 408.779-5449.

### APPLE PRICE CUTS FINISHED "MAC" OR "LEAP"

CUPERTINO, CALIFORNIA, U.S.A., 1990 JUNE 12 (NS) — Apple Computer President John Sculley has said that his company finished cutting prices "years or less for this year." His statement indicates that Apple will not further cut its prices on existing hardware before the full introduction of its lowest priced machines, which are expected in the near future.

In October, Apple is expected to unveil two new low-cost machines: an under-\$1,000 completed 68000-based Macintosh, and a low-cost 68030-based model machine with a 40 megabyte hard drive and two megabytes of RAM.

Various reports indicate the new low-cost machine, intended to compete with a slew of budget-priced IBM-compatible clones on the market, will replace the Macintosh Plus, the current bottom-of-the-line Macintosh, which will have a built-in hard drive, monitor, and a built-in add-on board.

on boards.

Apple is expected to unveil two low-cost laser printers in July designed to compete against low-cost offerings from Hewlett-Packard, among others. The Personal Laserwriter NT and SC are expected to cost \$3,500 and \$2,500 respectively.

Sculley reportedly says that a new laptop computer will not be among products to be introduced later this year, "but Apple is working in that area," he said.

### AUSTRALIAN TELECOM AUTHORITY STANDARDIZES ON MACS

SIDNEY, AUSTRALIA, 1990 MAY 30 (NS) — Auel, the Australian telecommunications authority, is to purchase a Macintosh network for its administrative needs. The system will consist of SE/30 and IIfx workstations plus a DGS file server for the existing accounting system.

The Macs were chosen "because of their

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User "Personalities" are transportable throughout Network-OS. Any user can log onto any available network station, and by utilizing the User Registration system, appear to be working on their own computer with familiar disk drive, program and printer assignments.

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According to Lisa Norquist of Soft Service, the software is the best package for the range that gives users this capability. Pricing on the package has yet to be decided. The software will start shipping at the end of this month.

Soft Service claims that Postscript is fully compatible with Postscript (a utility on the Amiga) and is therefore very easy to install. Once installed, the program automatically normalizes printer commands from the applications software and converts it to Postscript commands.

Contact Lisa Norquist, Soft Service, c/o Electronic, 440 West, 20232 Abo, The Wood, Tel: (858) 431-8779 (US only). E-mail: lisa@softservice.com

On GEM: the program can be found by accessing, in this order, the following screen: Computing, IBM PC Compatible, Removable, IBM PC, Software libraries, then Download a File.

As most viruses become known and new versions of the program are available, they can be downloaded from the Highways E&S at 315-245-0915.

TEigenet also makes HyperAccess/5, a telecommunications program with broad-based virus screening, for \$199.

Contact: Robin Shepherd, 458-554-0461

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## IBM WORLD

### PHOENIX ANNOUNCES 14

ISA LICENSEES  
NORWOOD, MASSACHUSETTS,  
U.S.A., 199 MAY 30 (NR) — Phoenix  
Technology has announced licensing  
agreements for its Enhanced Software  
Standard Architecture (ESSA) compati-  
bility software with 14 computer man-  
ufacturers. Several more contracts are cur-  
rently under non-disclosure agreements,  
Phoenix added.

The software, including a ROM basic  
input/output system (BIOS), Video BIOS,  
Keyboard BIOS and EISA configuration  
utility, will help the vendors build ma-  
chines conforming to the ESSA architecture.  
ESSA, a real-time EISA offshoot General  
Architecture, is backed by a group of  
IBM-compatible PC makers, including  
Compaq.

The companies named by Phoenix are:  
Advanced Logic Research, Altec Com-  
puter Systems, Asta Computer, Copan  
Electronics, Epson America, Intel,  
Micrologix Computers, Mylicor, NEC,  
Tandy (with its subsidiary Grady Systems),  
Toshiba, Tolly Computer, Wye Tech-  
nology and Zieck Electronics.

Contact: Richard Lennard, Phoenix,  
617-851-4805

### HCCOPY RELEASED TO PD - HAS VIRUS PROTECTION

MUNDO, MICHIGAN, U.S.A., 1990  
JUN 1 (NR) — HCCOPY, a file-copy utility  
designed to filter out viruses during file-  
transfer in real time, has been released  
to the public free of charge and can be  
found on GEM, and other networks.

HCCOPY, according to its creators at  
Hagreen Inc., works like the COPY  
command found in the DOS operating  
system, and adds a level of protection  
against virus infections.

HCCOPY detects 58 different viruses by  
using data from IBM and its Virus Scan-  
ning Program. If a requested file is in-  
fected with any of the known viruses,  
HCCOPY displays a warning identifying  
the virus and allows the user to abort the  
file copy request before the virus has a  
chance to infect the computer, accord-  
ing to the company.



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compact (but) for storage. And a  
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data size virtually to five.



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a full function 121 key  
available keyboard with  
numeric keypad, a 1.5" x 1.44  
megabyte internal floppy drive  
plus a 40MB hard disk drive  
and you'll soon realize why the  
Altima One is the only  
best of a computer. It is a best.

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## WINDOWS

JULY 4 (NS) — At the software summit session of the Spring Computers show, hosted by SoftLetter publisher Jeffery Turner, the major topic of conversation was from a company which was not exhibiting at the show: Windows 3.0 from Microsoft.

Bob Turner of Symantec, Carole Paton of the AKNOWLEDGE magazine, Paul Turner, Mark Eason of SoftLetter, Paul Gropen of Microsoft and Cassiano Mironoff of Microsoft all predicted that 2 million copies of the package will be in use by the end of the year. That Turner wanted that many may not be enough copies to make a worldwide market, noting that 2 million Commodore Amigas are in use worldwide, and that Apple Macintosh software developers were hungry when 2 million of those machines were in use. About 50 million IBM PCs and clones are in use worldwide, the panel estimated.

As the number of Windows users climbs in the next few years, however, more opportunities will be created for "third-party-software" business applications, the panel estimated, and some of the industry's big names could be in trouble. "Two kinds of companies won't do well: those that don't recognize Graphical User Interfaces, or GUI's, and those who don't have the know-how to develop the products well," said Turner. "The market won't just go to those who use the latest GUI software."

Paton suggested Lotus Development may be an example of it. Lotus Microsoft's suggestions on how to address Windows within Windows, as users become accustomed to a standard way of using the environment. "We have a content developer between corporate America and Jan. 1, 1991, and I'll bet on corporate America."

Contact: John James, 202-944-0000, TomPapa, 801-331-3005

## WORD FOR WINDOWS HAS POSSIBLE INSTALLATION BUG

BRUSSELS, BELGIUM, 1990 MAY 30 (NS) — Microsoft Word for Windows, the graphics word processor available for Windows 3.11 and above has a potentially serious bug which can cause problems when installing the package on a PC.

Although upon installation Word for Windows requests at least 5.5 MB (megabytes) of space on disk, the software's installation routine will proceed with installation even if this disk space is not available. When this occurs, installing the program wipes out the keyboard driver on the host system. As a result, Windows can no longer be used or reinstalled, because the keyboard lacks upon which the program is hosted.

It has been reported that the bug does not occur when a generic IBM keyboard is connected. The software company is working on a general solution but, according to reports obtained for Microsoft,

no decision on how to proceed has yet been made.

## B.C. BYTES

**NEW FOR IBM: Network Coaster Supports Windows 3.0**  
VANCOUVER, BRITISH COLUMBIA, 1990 MAY 15 (NIE) — Coasters Software has announced that its electronic mail software, The Network Coaster, will support Microsoft Windows 3.0.

The announcement is not Coasters' first foray into Windows, spokesman Michael Shandrick told NIEbytes. Coasters sold a Network Coaster version for Windows 1.0. The company also developed a version for Windows 2.1, which was provided to a few customers but not widely sold. But Windows 3.0 succeeded in support, what the company truly wanted to provide. Coasters, which was a beta-test site for Windows 3.0, has been changing at the last minute to Windows 3.0 product to market, Shandrick said. "Our users obviously wanted to upgrade a long time ago," he added.

Windows support requires a LAN9000 network interface module which resides on the network server along with the basic Network Coaster software.

Coasters also announced that Network Coaster will be announced with the worldwide Novell 4.00 networking server operated by Incent of El Segundo, California. Novell 4.00 enables electronic mail, facsimile and video transmission to more than 100 countries, according to Incent.

Contact: Michael Shandrick, Coasters Software, 604-622-0740, Inland, B.C. 335-1075

## CANADIAN NEWS

### LOTUS CANADA BEGINS

#### SHIPPING NOTES

TORONTO, ONTARIO, 1990 MAY 29 (NIE) — Lotus Development Canada has begun shipping Notes, the company's flagship groupware product.

Karl Meera, corporate marketing representative for Lotus here, said the Canadian sale was less than 500 orders for Notes yet, but decided there were prospects sufficiently promising that it was time to put the staff and sales to testing resources to place. "We had a list of salesmen that we looked at that we said we've got the opportunity to close them," he said.

Notes is designed to permit sharing of text, numeric and graphic information through networks, both locally and over wide areas. In Canada, an initial license costing as many as \$200,000 and revenues will reach \$2.5 million. Lotus will further market it within CNET's much. Later plans to sell the software directly rather than through dealers.

Contact: Karl Meera, Lotus Development Canada, 416-479-8000

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Is the race for quality, speed and affordability, the crowned Raven LP-800 Personal Laser Printer is way ahead of the pack. With a quiet printing speed of 8 pages per minute and for 18PPM LaserScript emulation mode, the LP-800 gives businesses the edge without the high price tag. Superior paper management with a large 200 sheet cassette and an adjustable status feed for envelopes, labels and computer paper meet top-tier quality (300 dpi) for clear, crisp graphics and type — standard with Raven.

Even built-in font and downloadable font capability allow high quality word processing and diverse business needs. A 11.2 MB RAM buffer is standard and memory can be easily expanded to 1.5, 3.5 or 4.5 MB.

All these features and more for nearly half the price of comparable units. And with over 100 million printers in the Canadian market, Reliant DG is the best.

enjoyed to back up Raven's one year warranty with two also include outstanding technical price and support that will translate into greater efficiency and savings for your business. For speed, quality, reliability, nothing beats the Raven LP-800 Personal Laser Printer.

### RavenScript Gives PostScript® System Compatibility

This optional software package gives the LP-800 entry level desktop publishing capabilities for considerably less cost than a PostScript printer. RavenScript provides 22 additional, scalable fonts and the ability to run all PC DOS® and IBM DOS® based software programs that output PostScript files including Adobe® PageMaker®, Microsoft® Word, Adobe® WordPerfect® and more.

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## COMPUTER ASSOCIATES OFFERS FIRST PIECES OF ACCPAC PLUS 6.0

GARDEN CITY, NEW YORK, U.S.A., 1990 MAY 12 (NH) — Computer Associates (CA) has announced that it will ship Version 6.0 of the Accpac Plus general ledger and financial reporting module, and Accpac Plus system managers, in June.

These are the first in a series of releases expected to bring all Accpac Plus modules to Version 6.0 level by the end of this year. John Schoenheit, of CA's Micro Products Division in Vancouver, said there is an official timetable for releasing the other modules.

The company said Version 6.0 fits into its recently announced CA 96 strategy for application providers. Enhancements in the general ledger module include redesigned data entry screens and the ability to create a unlimited number of

The system managers handle accounts such as file access, printing and communications for the functional modules, Schoenheit explained. The general ledger and financial reporting module comes with a basic system manager. Windowing System Manager, which allows multiple Accpac Plus modules to run at windows under DOS, runs option, and System Manager/1, which allows the software to run on the OS/2 operating system.

Prices are US\$999 for the general ledger module, US\$155 for the Windowing System Manager, US\$146 for System Manager/1 and US\$299 for CA's LanPat. Canadian prices are the same dollar plus service Canadian currency.

Contact John Schoenheit, Computer Associates, 804-757-8225, Kaitia Keyes, Computer Associates, 804-932-3513

## TELECOM

**NEW FOR IBM: Front-end  
Applications Software for Genie  
RISQUELLE, MARYLAND, U.S.A., 1990  
JUN 12 (NH) —** The Genie online information service, from GE Information Service, now offers a free front-end applications software package for PCs.

The Genie PC/Ataddin software enables PCs to automatically transfer access to selected Genie service online offerings such as GE Mail, RoundTable Bulletin Boards and software libraries at scheduled times or upon demand. It also allows Genie service subscribers to prepare messages "billed" prior to Genie service access charges.

The Genie PC/Ataddin software package can be downloaded by Genie service subscribers at no cost, except for connection time, from either the PC RoundTable or the Ataddin RoundTable on the Genie service. For more information, call 800/628-9526.

modulation standard and V.42bis error-control data compression standards, as well as Hayes' older proprietary standards, is priced at \$1,195. Said President and Founder Steven Hayes, "V.42bis 9600 represents the success of our first truly global product design. We have already received EART approvals for the United Kingdom and are moving rapidly to obtain approvals in 50 other countries."

Hayes also announced upgrades for its Smartcom II program and Smartcom II for the Macintosh. Both products were enhanced to provide the V.42bis data compression and error-correction algorithms which bring the effective throughput of a 9600 baud modem to 36,400 bits/second. The software also supports the Hayes Enhanced SoftFax, which allows for three fast file transfers even on slower connections. Smartcom II for the Macintosh Version 3.1 also supports the ZMODEM transfer protocol, which allows users to send files to an unattended remote system. Upgrades for Smartcom II to Version 3.2 will cost \$35 starting June 15.

Upgrades for Smartcom II for the Macintosh in Version 3.2 will cost \$25 starting the same date. Users who bought their software after March 1 will be upgraded free.

Finally, Hayes announced a strategic relationship with Phylos Communications of Fremont, CA. The relationship has already resulted in the joint development of a fully compliant CCITT V.32 modem module from Phylos, the FH3-960L, which meets global requirements. This module is contained in the Hayes Ultra 9600. "By working closely with Phylos in the development and extensive testing of FH3-960L, we have ensured our customers of a quality CCITT V.32 module with improved capabilities that meet Hayes' performance standards," said Steven Hayes. "Our relationship with Phylos benefits the entire industry by offering a competitive cost and performance alternative to modem engines supplied by Rockwell."

Contact Steven O'Brien, Hayes, 404-449-4791

**POLICY TO ENCOURAGE  
INTELLIGENT NETS**  
WASHINGTON, D.C., U.S.A., 1990 MAY 29 (NH) — The United States needs a national telecommunications policy that removes obstacles to intelligent, digital, interconnected broadband networks, Northern Telecom has said in a new study of intelligent networks.

In a statement submitted to the National Telecommunications and Information Administration (NTIA), the communications equipment maker argued that present policies inhibit the deployment of new technology. In particular, Northern said, legal and regulatory restraints work against the use of broadband optical fiber for local service.

Removing those restraints would "not in place the infrastructure for the significant economic benefits of an all-optical

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SOYO 986	Intel 986	1MB	10MB	\$2,699
SOYO 1086	Intel 1086	1MB	10MB	\$2,899
SOYO 1186	Intel 1186	1MB	10MB	\$3,099
SOYO 1286	Intel 1286	1MB	10MB	\$3,299
SOYO 1386	Intel 1386	1MB	10MB	\$3,499
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SOYO 3986	Intel 3986	1MB	10MB	\$8,699
SOYO 4086	Intel 4086	1MB	10MB	\$8,899
SOYO 4186	Intel 4186	1MB	10MB	\$9,099
SOYO 4286	Intel 4286	1MB	10MB	\$9,299
SOYO 4386	Intel 4386	1MB	10MB	\$9,499
SOYO 4486	Intel 4486	1MB	10MB	\$9,699
SOYO 4586	Intel 4586	1MB	10MB	\$9,899
SOYO 4686	Intel 4686	1MB	10MB	\$10,099
SOYO 4786	Intel 4786	1MB	10MB	\$10,299
SOYO 4886	Intel 4886	1MB	10MB	\$10,499
SOYO 4986	Intel 4986	1MB	10MB	\$10,699
SOYO 5086	Intel 5086	1MB	10MB	\$10,899
SOYO 5186	Intel 5186	1MB	10MB	\$11,099
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SOYO 6586	Intel 6586	1MB	10MB	\$13,899
SOYO 6686	Intel 6686	1MB	10MB	\$14,099
SOYO 6786	Intel 6786	1MB	10MB	\$14,299
SOYO 6886	Intel 6886	1MB	10MB	\$14,499
SOYO 6986	Intel 6986	1MB	10MB	\$14,699
SOYO 7086	Intel 7086	1MB	10MB	\$14,899
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SOYO 7286	Intel 7286	1MB	10MB	\$15,299
SOYO 7386	Intel 7386	1MB	10MB	\$15,499
SOYO 7486	Intel 7486	1MB	10MB	\$15,699
SOYO 7586	Intel 7586	1MB	10MB	\$15,899
SOYO 7686	Intel 7686	1MB	10MB	\$16,099
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SOYO 8486	Intel 8486	1MB	10MB	\$17,699
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SOYO 8686	Intel 8686	1MB	10MB	\$18,099
SOYO 8786	Intel 8786	1MB	10MB	\$18,299
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SOYO 8986	Intel 8986	1MB	10MB	\$18,699
SOYO 9086	Intel 9086	1MB	10MB	\$18,899
SOYO 9186	Intel 9186	1MB	10MB	\$19,099
SOYO 9286	Intel 9286	1MB	10MB	\$19,299
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SOYO 9486	Intel 9486	1MB	10MB	\$19,699
SOYO 9586	Intel 9586	1MB	10MB	\$19,899
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SOYO 9886	Intel 9886	1MB	10MB	\$20,499
SOYO 9986	Intel 9986	1MB	10MB	\$20,699
SOYO 10086	Intel 10086	1MB	10MB	\$20,899
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SOYO 10486	Intel 10486	1MB	10MB	\$21,699
SOYO 10586	Intel 10586	1MB	10MB	\$21,899
SOYO 10686	Intel 10686	1MB	10MB	\$22,099
SOYO 10786	Intel 10786	1MB	10MB	\$22,299
SOYO 10886	Intel 10886	1MB	10MB	\$22,499
SOYO 10986	Intel 10986	1MB	10MB	\$22,699
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SOYO 19486	Intel 19486	1MB	10MB	\$39,699
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SOYO 19686	Intel 19686	1MB	10MB	\$40,099
SOYO 19786	Intel 19786	1MB	10MB	\$40,299
SOYO 19886	Intel 19886	1MB	10MB	\$40,499
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SOYO 20886	Intel 20886	1MB	10MB	\$42,499
SOYO 20986	Intel 20986	1MB	10MB	\$42,699
SOYO 21086	Intel 21086	1MB	10MB	\$42,899
SOYO 21186	Intel 21186	1MB	10MB	\$43,099
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SOYO 21686	Intel 21686	1MB	10MB	\$44,099
SOYO 21786	Intel 21786	1MB	10MB	\$44,299
SOYO 21886	Intel 21886	1MB	10MB	\$44,499
SOYO 21986	Intel 21986	1MB	10MB	\$44,699
SOYO 22086	Intel 22086	1MB	10MB	\$44,899
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SOYO 22286	Intel 22286	1MB	10MB	\$45,299
SOYO 22386	Intel 22386	1MB	10MB	\$45,499
SOYO 22486	Intel 22486	1MB	10MB	\$45,699
SOYO 22586	Intel 22586	1MB	10MB	\$45,899
SOYO 22686	Intel 22686	1MB	10	



live-based society," said Roy Merrill, president of Northern Telecom Inc., in the statement.

According to Northern, local fiber connections could carry critical customer signals and other video programs as well as voice, data and image services.

The collaboration to the NTIS was made in connection with the agency's Comprehensive Study of the Domestic Telecommunications Infrastructure.

Contact: Frank McNulty, Northern Telecom, 602-754-8216

#### CALLER ID: WHAT'S THE PROBLEM?

— **Editorial by D. Blankenshore**  
ATLANTA, GEORGIA, U.S.A. (PHN) 511 (N) — Judges in Pennsylvania have ruled that live voice legal bills to the Caller ID service. Caller ID is the consumer offering of a technology called Automatic Number Identification, ANI was, at one time, the heart of a technology called HON in the 1980's.

Many people called HON "I Still Don't Know" or "I Still Don't Need It," but as it's been called out nationwide it comes to mean two things: Digital and Incoming Communications.

First, each phone line will be digitized, with 6 channels of 64,000 bits/second which can be used for voice, fax, or data services. While most voice lines can take the whole 64,000 bit/sec line, most can also be compressed, and some services have used compression to offer video conferencing within that bandwidth. A fax machine can send a page every 15 seconds at 64,000 bits/second, and most PCs are familiar with modems that work at 2400 bits/second. Henceforth, all these devices can share the same phone line.

The second meaning of HON is a two-way signaling channel, existing at up to 36,000 bits/second. This is being used, first, to carry caller's numbers in the called party. That's ANI. When ANI is used to transmit, it's called Caller ID. Used the Pennsylvania decision, the courts there to Caller ID were legislative, a California law mandating the right of people to block their numbers from going out on a per-call basis, and a proposal by Sen. Herbert Gold, a Wisconsin Democrat, to offer blocking nationwide.

ANI is already being used, increasingly, on three types of calls. For emergency, a service called Enhanced 911 is sending your number to the police as you call. This not only can cut false alarms, but helps police find perished victims, even if they can't locate their address. On toll-free 800 and toll-paid 900 numbers, ANI is used in creating distance and routing toll to providers can know what their customers are like, and learn of other likely prospects.

Police agencies are also using Caller ID on the one hand, the technology network side, and makes the accident of criminals easier to track. On the other

hand, the same technology can be used by criminals to commit and uncover crime, and by abusive bookends to find their wires.

To some merchants, ANI is a prime extension of current marketing technology. If you give money to an eleven-night group, for instance, you'll soon get mail from that fanatic audience. If you give to Pat Robertson's 700 Club, you'll get mail from like-minded organizations. The same is true as packaged goods. Mailing list management is a multi-billion dollar

industry, and although the lists could be combined to create a profile of your life, most consumers don't object to the practice.

ANI, in fact, doesn't yield nearly the kind of detail on your habits that would beget a shopper program are picking up without trouble. Here, shoppers get cards which record their purchases, and instant coupon which can claim money. Investors, retailers learn who their goods their customers need, and tell the data to marketers.

Industry has already recognized this power in ANI. The Direct Mail Association is campaigning against it, knowing that ANI will create making less later, and for less money. Epsilon Bell is holding meetings this week with local businesses, helping them create applications for ANI. Dan A. Bradstreet is selling its direct-mail subsidiaries in connection with the online business, and you can expect them to use ANI there in some way. The phone company, Telephone and US Sprint, are already selling such

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ing him based on their collection of ANI data in 1,000 and toll-free 1-800 calls.

To the industry, then, ANI just means better marketing, more targeted messages and less junk mail.

But what's the best ANI in the last step in a process which will make your lifestyle an open book to anyone who wants to open it. With ANI, every call you make could put you into a database for real. Using the advanced computers of the 1990's, anyone big enough to screen a mainstream, be they a politician, corporation, a private investigator or the government, could "profile" your lifestyle with pinpoint accuracy, and, perhaps, use that against you.

With ANI, you'll have no secrets any more. This privacy advocate shudders. "We are the past, and realize we're all lost for the war to be left alone. They use a future of politicians intimidated or otherwise harassed because their consuming or calling "profile" matches that of some type of criminal, and they're scared. They want rules, now, to control ANI, and harsh penalties for violations of these rules."

The battle over ANI will be fought first in place like Pennsylvania which has the most favorable territory for privacy advocates. But ANI is also being rolled out to harder legal climates, from Europe to Asia to Latin America. That's why the alarm is going out now. And it had best be made to loud as possible.

### INFONET CONNECTS WITH WORLDWIDE, MCI MAIL, SOFTSWITCH

EL SEGUNDO, CALIFORNIA, U.S.A., 1989 JUN 1 (NE) — Infonet, the packet network which is 25% owned by MCI, has announced that it will interconnect to Notice 400 E-mail service with Touch Communications' Worldwide-400, which will allow Infonet's NOTICE 400 customers to expand their reach to over 5 million E-mail users on local area networks (LANs) or Unconnected systems worldwide.

Touch Worldwide 400 will permit NOTICE 400 clients to exchange messages through X.400 channels with users of UNICSTAMP and UNICP or Mail, Action Technologies' MMS, Macintosh Mail, QuickMail and TOPS in Box Plus LAN E-mail packages.

This announcement closely follows Infonet's announcement that it will interconnect/Notice 400 messaging service with MCI Mail and Atlas 400. There are also in progress to certify the interoperability of Notice 400 with SoftSwitch X.400 Gateway and Consumers Software's Network Gateway 400.

Notice 400 is based on the X.400 standard for passing messages between systems approved by the International Standard Organization, and is accessible at more than 100 countries. Users may also transmit binary files via Notice 400 without first converting them to ASCII text.

Infonet also announced it will interconnect to Notice 400 service with SoftSwitch

X.400 Gateway, Soft Switch X.400 Gateway will connect Notice 400 users through Soft Switch Central on an Infonet client's IBM authorization. Soft Switch Central is a mail exchange program designed to link 400 different Local Area Network schemes, including IBM's Office Vision, PROBS and DISCOS, Digital's All-in-One and VMS Mail, Wang CH/PC, Hewlett-Packard's Desk Manager, Sun's VMS Mail, SCO's 3-Mail, Consumers Software's Network Gateway; or Mail and Easible's iHaggle Mail.

Contact: Mike Radice, Infonet, 215-555-2875; Jane Levene, MCI International, 202-654-4400; Donald Fisher, Soft Switch, 215-660-6600

## TRENDS

### INTEL TO BANISH CFCs BY 1992

SANTA CLARA, CALIFORNIA, U.S.A., 1989 MAY 20 (NE) — Intel Corp. is promising to eliminate all use of chlorofluorocarbons (CFCs) by 1992, and calls its decision "one of the most aggressive programs in industry."

Given the environmental damage of CFC's, which are known to destroy the earth's thin ozone layer, Intel Chairman Gordon Moore proclaimed that his company, "has undertaken an aggressive worldwide program to successfully reduce CFC emissions by implementing good controlled conservation practices."

Specifically, Intel is replacing CFC-based circuit board cleaning equipment with machinery that uses an aqueous-based cleaner. The change affects facilities in Oregon, Ireland, Puerto Rico, and Singapore. The new equipment is expected to be online end of line/system manufacturing plants by the end of 1990.

Intel says it initiated a comprehensive CFC Tracking Program in 1987 to establish detailed its worldwide usage. Since that time, using controls, conservation, and alternative materials during its work, the company has reduced its CFC use by 50 percent.

Contact: Howard High, Intel, 408-765-1440

### HP OFFERS TONER

#### CARTRIDGE RECYCLING

PALO ALTO, CALIFORNIA, U.S.A., 1989 JUN 12 (NE) — Hewlett-Packard's efforts to recycle spent laser cartridges is designed to reduce the volume of plastic going into landfills. Owners of HP Laserjet printers are being urged to return their spent cartridges rather than throw them in the trash, and are being offered free postage for their efforts.

The recycling program, which started June 1, extending to a trial basis through December 31 in 11 states: Arizona, California, Colorado, Idaho, Minnesota, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. If successful, the program will expand nationwide not to Canada by 1991. Similar programs have

recently been announced in Switzerland and Germany and HP plans to expand to other European countries in the near future.

The National Multiple Recyclers and the National Conservancy will share a \$1 donation for each cartridge returned through this program.

Customers need to get a free laser cartridge recycling kit from their HP dealer or reseller. The kit includes instructions for repackaging the cartridge, a cartridge return tag, and a prepaid United Parcel Service shipping label.

HP intends to make down the aluminum down and recycle it as a raw material. Other parts will be removed and reused to make new laser cartridges.

Contact: Gady Piner, 615-595-6545.

**GLOBAL NAVIGATION SYSTEM BEING DEVELOPED**  
MINNEAPOLIS, MINNESOTA, U.S.A., 1990 MAY 30 (NR) — Honeywell and Northrop/Northern announced an agreement with Swiss aviation officials that could lead to a global system of navigation which is free of ground-based equipment.

Under the agreement, Northrop will become the first Western airline to use GLONASS, the Soviet satellite positioning system. Honeywell was U.S. rights to develop GLONASS for commercial aviation.

The agreement takes the form of a Memorandum of Understanding regarding integration of the U.S. Global Positioning System with the U.S.S.R. Global Orbiting Navigation Satellite System. Discussions began last September and were concluded May 18 in Leningrad. The agreement is for 5 years, subject to approval by both governments.

The Soviet participants will loan two sets of GLONASS surface navigation equipment to Honeywell and Northrop. The GLONASS equipment will be compatible with international standards. Delivery of GLONASS equipment to Honeywell and Northrop will take place in December with installation starting 360 days later. February. Flight testing would take place from March-September 1991 and a complete report would be due in December 1991.

GPS and GLONASS are satellite-based navigation systems. Both are intended to perform as a "wide screen of navigation" for commercial aviation, providing accurate positioning data in their domains, with similar levels of accuracy. Both systems will use 24 satellites in orbit, excluding three spares, although orbital configurations and other details differ.

Contact: James Vothdeffer, Honeywell, 602-668-2200; Bob Callahan, Northrop Airlines, 812-799-1251.



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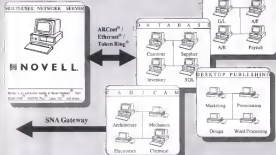
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works," claims Peter Watson, president of KIS.

The Builder X-series also includes standard libraries to facilitate porting to other systems and includes called the Pointe, Resource editor, and Runner.

The Builder X-series, \$2,490, is available for Sun, DECstations, DG AVIRON, Silicon Graphics, Sony News, and Macintoshes running A/UX. It will soon be available on the VAX/VMS and IBM RISC System/6000 as well.

Contact: Pia Benelli, KIS, 417-647-6500

## GENERAL

### WALT DISNEY LAUNCHES NEW SOFTWARE LINE

CHICAGO, ILLINOIS, U.S.A., 1990 JUN 4 (NS) — First new cartoons, four full-length movies, later it was amusement parks and hotels. Now Walt Disney is moving into computer software.

In a poster showing it in Chicago Hotel, the newly formed Walt Disney Software of Burbank, CA, demonstrated its new line of personal computer software. Initially the products will be in three lines: entertainment, education, and personal productivity.

Products will be available for the Amiga, IBM PC, G4, and the Apple II. Initial products are expected to be released during the third and fourth quarters of 1990.

Disney announced that one of its first products will be a new language: Disney's Second Source. The Second Source is a three-fold speaker that attaches to the parallel port of an IBM PC or compatible. (The port can still be useful to others.) The device will generate speech, music, and sound at much better quality than standard PC speakers. The Second Source uses Disney's own proprietary system but the company is making it available to other software developers. The price is \$54.95 and it will be available with some of Disney's initial releases.

A representative from another software company did not welcome the introduction of yet another source installed into the PC marketplace and questioned whether his company would support it.

Most were impressed by a demonstration of Disney's animation package, The Animation Studio (A17946). The program will be released initially for the Amiga followed by releases for IBM PCs computers and includes a tutorial on animation using actual examples from Disney cartoons. It uses animation technology to allow designers to see the current animation released the three behind it. The program includes a public domain projector so people can distribute their animation products to others.

Also included is a full range of sound effects from Disney cartoons.

Contact: Ralph Gaffie, Marketing, Walt Disney Software, 818-567-5543

### FRANKTON REJOINS BRINGLED AT SLATE

WATERTOWN, MASSACHUSETTS, U.S.A., 1990 JUN 1 (NS) — State Corp. has announced that Robert Frankton, co-developer of industry-sponsored VisiCalc, will leave Lotus Development and join State. The move reunites Frankton with Don Brinkley, the other VisiCalc co-developer.

Frankton and Brinkley founded Soft-ware Arts in 1979 and launched VisiCalc, the first electronic spreadsheet and the program generally attributed with the proliferation of personal computers throughout the business world. Frankton remained with Software Arts until its acquisition by Lotus Development Corp. and was chief scientist at Lotus.

State is developing software that focuses on those computers such as the G4 and Pad which use pen or stylus input rather than the traditional keyboard. Industry analysts say that State is working on software for computers that G4 Corporation will introduce later in the year.

Brinkley, a co-founder and vice president of State, told Newsday, "I am thrilled to be working with Bob again. We have been close friends for a long time and I am sure that Bob will make immense contributions to State's progress."

Contact: David L. Ball, State, 603-449-7922

## WORLD NEWS

### NEW PRESS LAW ADOPTED BY USSR SUPREME SOVIET

MOSCOW, U.S.S.R., 1990 JUN 11 (NS) — A new, long-awaited USSR Press Law has been approved by Soviet lawmakers. Under this new law, say Soviet editors, for the first time in USSR history, will be allowed to run his own desktop publishing house. The law will also end decades of government censorship.

According to parliament reports, the new law, a draft of which had been seen by Newsday several years ago, is expected to be fully implemented within a couple of months.

The new law, however, does not address what many journalists say is a basic problem: inhibiting freedom of the press in the Soviet Union — the government monopoly on the limited supply of printing paper. There has been a chronic shortage of newspapers in the USSR and the government has been able to allocate supplies to agencies it likes even though.

The law triggered debate considerable opposition from members of parliament who sought to keep newspaper publishing under the control of Soviet institutions and collective enterprises.

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# RUSSIANS NEED COMPUTER INFORMATION

MOSCOW, U.S.S.R., 1980 MAY 29 (NS) — There's a huge demand for computer books in the USSR and it's long-term one, Boris Mokhaev, director of the ComputerPress Advertising and Publishing agency told Newsbytes.

Mokhaev cited several examples. First, his ComputerPress magazine, which publishes articles on computer hardware

and software compiled by his staff from Western sources, is a monthly magazine with a circulation of more than 70,000. Copies don't specifically take on assignments or shop shelves, Newsbytes was told.

But a more interesting story is what happened with the book for new IBM PC were written by Soviet programmers. As soon as the first 300,000 copies were printed, they were completely sold out in

Moscow within 3 days after sales began—and the third printing is in progress now, Mokhaev said.

Even problems with paper shortages which badly affect all new small publishing agencies can't stop the publishers. According to Mokhaev's estimates, paper for his magazine bought abroad sold cost him \$75,000 per issue while revenue from Western advertising was total a bit less.

Several new publishers are entering the market despite the paper shortages, which have been known to cause even big national newspapers like the 20-million-copy daily *Kommunisticheskaya Pravda* to miss a couple of daily issues. Despite the difficulties, there's still plenty of room to publish in the computer and communications book market, Mokhaev said.

CONTACT: Boris Mokhaev, ComputerPress, phone +7 095 133-0540 fax +7 095 333-0522

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### MOSCOW: WESTERN MAGAZINE READERS SERVICE WORDS

MOSCOW, U.S.S.R., 1980 MAY 31 (NS) — Newsbytes Moscow Bureau conducted a research project concerning the effectiveness of Western magazines' readers service cards to U.S.S.R. addresses. Forty days later, the results are trickling in.

Newsbytes sent to *PC World* by mail and *Rye* magazine by fax, reader's service cards, otherwise known as the "MART" "Dingo cards," both requests for information from some 50 companies. The companies had been advertised in the magazine classified catalogs were not sought.

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explain why, let me tell you my own story.

I used to back up my hard disk every Saturday, using Backup, the functioner in Backup Plus. Even when I completed my file before backing up, it took 90 minutes. I would listen to the Metropolitan Opera broadcast on CBC radio to avoid getting too bored. I would back up, then verify to ensure the diskette was readable. Usually, after I had backed up 60 diskettes, and had just verified disk number 70, Backup would discover an error. I would then have to start all over from scratch. Usually I spent all day, every day, doing nothing but backups, eating Wood-curdling amounts of frustration every day. During the week I might lose a file and have to use my Backup to recover it. About one chance in ten, I still could not recover because the floppy was unreadable. Sometimes the problem was that I had mistakenly inserted the wrong diskette during the backup. Sometimes a bad disk not created by the Backup program in the drive. Sometimes I had deleted or scratched the floppy surface.

#### Life With Tape

I never considered mag tape backups because they were too expensive. These are the only I calculated how much I was spending on floppy backups, given that my time was worth 10 dollars per hour. I immediately bought a mag tape backup.

Now I back up every night, not just once a week. I insert a mag tape cartridge that looks like a heavy-duty cassette. It type a couple of keystrokes, then leave the office. When I come back in the morning the entire backup is done and verified. My own tape drive is great. I run only a little faster than a floppy. However, I don't have to sit there, waiting it, fooling the diskette in. When I go to restore a file, I have had 100% success recovering. The average street price of a 100-meg mag tape drive such as the Colant 40-124 is about \$225. For business, as anyone who drives over 90 MPH, a mag tape backup unit is mandatory. For hard disks over 100 MB, you would probably want a better, more reliable, bigger, and more expensive, tape drive.

#### Is Floppy Backup all that Bad?

If you occasionally use mag tape backup, or if you have very little data — just programs that could easily be reinstalled — you can get away with a program that backs up in floppy disk. Floppy backup probably has improved since the days I used it. The drives themselves are more reliable. The new AT 1.44 MB floppies contain four times as much information as the old XT 560 KB floppies and their hard disks perform faster. They need only a quarter as many floppies to back up; this means only a quarter as many chances to fail up. Modern backup programs record automatically to floppy tapes instead of making parts of floppies. Even so, tape is still much more reliable and foolproof.

#### How Do You Use Floppy Backup?

Backing up is a very simple. You select which hard-drive partitions (C:, D:, etc.) you want to back up. Then, within those drives you select which directories you want to back up. Then, within those directories you select which files you want to back up. Then you find in diskette after diskette as the program copies the information to floppy. This sounds very simple. However, the designers of the backup programs, with few exceptions, have made this much more difficult than it could be. Because the process is mind-boggling, most backup programs offer "presets." A computer expert selects the implied options, directories and files, then runs the whole selection under a name such as "WEEKLY." From then on, anyone can run the whole backup routinely just by typing WEEKLY.

#### Picking Up The Pieces

If all goes well, you never have to restore from your backup. However, if you corrupt or lose some files, you select the partitions, directories and files you want to restore. The program then leads you to emergency file diskettes and it replaces the damaged files with your backup copies.

The designers part of their efforts into the backup side of the program since we use it much more often than restore. They sometimes leave the restore as an afterthought. So you will find, with few exceptions, restoring is considerably harder than backing up.

#### Backup Horror Stories

I work with charities. Here are some of their mistakes I hope you will be able to avoid.

#### Backing Up After the Crash

One client had not done any backups for a month. He had a crash. He felt guilty and did not want me to find out that he had been doing his backups, so he immediately did one — after the crash. What fun accomplished to copy corrupted files over top of already good, mostly-old backups. Fortunately, he had another backup that was six months old. He lost six months' work!

#### File Drills

Another client was used to the standard Backup Plus backup program. He decided to install it himself. He did not test his conclusion to make sure he was actually able to restore. He had a crash. He ran the restore, and lost the directories through file nothing happened — his files were still corrupted in a panic, he phoned me. Luckily, I named out all he needed to do was use a special option which, only available on the advanced menu, in allow the program to restore corrupted files. He abandoned the program and replaced the diskette without realizing that he had lost his files. He knew that Backup Plus had hidden data on the boot track of his diskette, subtly corrupting them. He thought a new hard disk, since files would mysteriously appear and disappear from those floppies.

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an interface. It uses a proprietary format that saves more data per track. Instead of using the slow DOS directory and FAT structure to read the hard disk, it builds its own index. It develops reading the hard disk and writing to floppy using a technique called Simultaneous DMA. While you are busy copying data, it uses the time to get ahead on reading the hard disk. The instant you put the next diskette in, it starts up without waiting for you to hit a key.

Other backup programs use some of these tricks, but only Norton saves all of them.

#### Proprietary Formats

The Fastback was the first fast backup program. It was a commercial loss because it used a proprietary format. Incorporated an extra sector of data into each floppy unit. To follow reason, it had to alter the gaps between the sectors. If your drive speed was the last bit out of which, Fastback would not work. Proprietary formats cannot be had regularly and Fdisk Generation reached its conventional DOS format with Fastback Plus.

However, Norton and PC-Fastback Plus use proprietary formats with larger sectors, and fewer of them, to cram more data onto a floppy quite safely. Since there are fewer sectors per gap, there is still room to make the gap regulation size.

Proprietary formats do have their drawbacks, however. The first time you use a diskette, it must be specially

formatted. Even though this is automatic, it makes the backup take twice as long the first time. If you ever decide to recycle a backup diskette for use as a normal DOS diskette, you first must use the DOS FORMAT command. You need to mark your diskette with colored dots to track which format they are. If a proprietary format diskette becomes unreadable, none of the recovery utilities such as HDTEST, Norton NU or Mac will be of any use.

Norton gives you a choice: proprietary format for extra speed, or conventional DOS format for extra safety. PC-Fastback Plus always uses proprietary format. The others always use DOS format.

#### Norton Backup

Norton Backup works best if you have a mouse. You just point and click at the options and files you want, or point and click at spaces available in the backup format and type. This is as easy to use as a Macintosh.

If you don't have a mouse, the program is a little more complicated to use since you must use the Arrow, Tab, Space and Enter keys to navigate and make selections. You need to read the manual to get the logic; allow these keys work, but once you are understood that, you can figure the manual way. The program desperately needs some on-screen prompting in the use of these keys — especially during the install.

Norton marks the disk before you begin to back up both with bold and with check marks. However, what is really doing is marking the ones you change back.



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backup. Time has passed it by. Back-It-4 is a disappointment. The changes from Back-It-3 are nearly all show and no substance. Back-It still makes your first-year all your diskettes back in, when all you want is more in a tiny file. The method you use to select the drives, directories and files to backup is even more obscure than it used to be! Navigation left me aghast. The arrow keys rarely do what I expected to go.

In the old Back-It, Restore was a three-

stage process, with only certain commands valid at each stage. I happily find this significant to go.

On the positive side, Back-It is the only program with parental tags, so you can tell the backup what to do with any new directories that should appear. It was also one of the few programs to correctly restore an empty directory.

#### Intelligent Backup

Starting, Intelligent backup is a turtle, only marginally faster than the glacial DOS backup

Like a spoiled child, it has an odd habit of writing only a few bytes on a diskette before asking for yet another fresh one. I think it likes to start every large file on a new diskette.

The display during backup is something only an accountant could love. It is nothing but statistics. It looks like a Tar Baby. It will take you about 70 key-strokes to get out of it. Aborting is almost impossible.

On the positive side, it has a straight forward multiple-choice type menu

system. It has one major point in its favor — it does what you want the computer to do. Unfortunately, it modifies all your backup sets into one.

#### DOS Backup

DOS comes with a "free" backup program called BACKUP. I strongly recommend you avoid using it. Firstly, DOS 3.3 BACKUP is about four times slower than a proper backup program. The version that comes with DOS 5.0 had 20 repeated bugs. A Microsoft tech

representative called Mike "Amos" of MS-DOS, "free" from the latest 4.01 program introducing additional bugs. If you insist on using it, you may find you cannot restore your files. I have written a replacement for the DOS RESTORE program to ensure you should this happen. I will send you a copy anywhere in the world for \$5. As with all my diskettes, you are free to make copies and pass them on to your friends. Unlike the official RESTORE, mine works under any version of PC-DOS or MS-DOS and restores files backed up under any other version. Because of this feature, the Federal Aviation Administration needs to distribute software.

#### Magellan

Magellan is not a true backup program. It is a navigational file-finder for you when you cannot remember what they are called, when all you remember are a few words that might be in the documents. It can also find groups of files from all your drives and directories that are related by topic. It lets you view those files in their native mode. For example, if you peek at a spreadsheet, you don't see lots of gibberish, instead you see a real spreadsheet. You don't have to bring up I-2-3 to look at it. I think everyone with many small files should immediately buy a copy of Magellan. Everyone else could wait perhaps a week. Magellan is the most useful utility I have come across in the last five years.

As a backup program, though, Magellan is pathetic. Its wrong guess is an magical ability to find a set of files that need some criticism to back up.

#### Bugs

In the bad old days, if you backed up your root directory, then announced it, your hard disk would become unbootable, because someone would disturb two system files, IO.SYS and MSDOS.SYS. Happily, none of the true backup programs still have that problem. I found one small bug common to Norton, FastBack Plus, PC FileBack Plus and Intelligent Backup. They all fail to restore a directory, unless it contains a file. Only PC Tools and Backup got this right.

Intelligent Backup did not work properly unless I preformatted the diskettes first. If you short a backup part way through, a gets

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unsafed, and does not record the fact that the backup is no longer valid. Protecting Yourself From Bugs I have not had enough experience with any of these programs to feel confident about any backup. You must protect yourself by testing the programs yourself. They may work fine on someone else's computer, but not yours.

After you install your backup program, backup some files, and make duplicates on another part of your hard disk. Delete the originals. Data restore them and compare. If you find differences, report the problem to the manufacturer. Don't trust the program until you have done this with at least 10 different bits of data. Be especially careful of Norton (because it is new), and PC Tools because of Great Point's history of releasing improperly tested software.

**Incremental—Three Backs Of Backup** There are three kinds of backups: full, incremental and differential. I recommended that you avoid incremental and differential backups. That is all you have to know. For the reasons, I hope you will find this explanation clearer than those in the manuals.

A full or complete backup backs up all the requested files. Differential backups only back up files that have changed since the last full backup. Incremental backups only back up files that have recently changed, since the last incremental or full backup. With a full backup, when it comes time to restore, you have only one set of data to restore to itself. With differential backup you have two. With an incremental you might have anywhere from two to twenty sets to find with. However, incremental backups are faster than differential, which are more faster than full.

For each file, DOS maintains the archive bit that notes whether a file has changed since the last backup. When you do an incremental or differential backup, you only back up the changed files. When you do an incremental backup, you have the bit off so you won't back up that file again.

When you do a differential backup, you leave the bit on so you will restore to back up all the changed files over again every time you back up. Only one-on-one differential backup do you turn off the archive bit.

When you restore an incremental backup, you have to restore all the backup sets. You would need to keep track of all three sets independently, so you would need three archive bits for each file. Unfortunately, DOS periodically one archive bit per file. So, if you use incremental and differential backups, you can have only ONE backup set. This is being diagnosed.

#### Feature

The most generation of backups will attempt your backup sets, telling you which ones to back up today, which ones to take off, which ones to bring over the others.

They will allow incremental backups, by maintaining their own records of

which files have changed. That way you will be able to maintain several independent backup sets.

You will track which files have been deleted, so that when you restore, all your deleted files will automatically come back to backup set.

All these wonderful things will come to pass as soon as the cost of tape tags drops low enough to completely obsolete floppy backups.

#### Access

The prices quoted here are average Vancouver street prices in Canadian dollars.

—Peter Norton Backup 3.1, 186 Webster Blvd., Santa Monica, CA 90406-1294 Customer service (813) 319-2010 Tech support (813) 315-2095 FAX (813) 315-2046 About \$130

—PC Tools 6.0, Central Point Software Inc., 35220 N.W. Greenbush, #200, Beaverton, OR 97006 (503) 666-6006 About \$120

—Backup Plus 2.10, Ritz Generation Systems, 18009 North Ridge Road, Rose Ridge, LA 70660, (504) 291-2221. Sales (800) 875-4398 Tech support (504) 291-2263 About \$140

—PC Fullback Plus 1.1, Westlake Data Corp., P.O. Box 1711, Austin, TX 78767 Telephone (512) 855-1041 About \$35

—KeyBackup Plus, The First Group, 3950 El Camino Real, Suite 3, Palo Alto, CA 94306, (415) 325-2020 About \$100. Back It Up, Guala Systems, 43 North University Avenue, Suite 16, Provo, UT 84601 (800) 335-6563 (801) 377-4285 FAX (801) 377-5023 Customer support (800) 733-5543 About \$90

—DOS Backup 4.06 - comes bundled as part of MS-DOS.

—Loma Magazine VLO file manager, Lotus Development Corporation, 34 Cambridge Parkway, Cambridge, MA 02142 About \$350

—Dataquest Backup 5.66/5.5.1, Sterling Software, 3235 Sheppard Avenue East, Suite 101, Willowdale, Ontario, M2J 3E5, (416) 493-5080 FAX (416) 493-5184 About \$380

Access to Packages Not Reviewed Here Unfortunately, the copy of Micro Interface QuikRepe 2.65 was damaged in shipment so I could not evaluate it. Gore did not provide us with a review copy.

—GoldTree 3.55, Micro Interface Corp., 1650 N.W. Avenue Suite 200, Miami, FL 33015 (305) 335-6088 About \$290

—COREPac, Core International, 1171 North Federal Way, Boca Raton, FL 33433, Sales (800) 972-6655, Tech support (561) 377-9235 About \$380 Summary

The newcomer, Norton Backup, is another one. It is the one I would recommend. PC Tools is a bargain if you want all the attachments. Backup Plus is the standard version. If you can afford it, forget backups and get tape. Backing up to floppies is so exciting so watching your tape, but you have to do it.

#### About the Author

Randy Green is president of Canadian Retail Products, 4149 1030 Mainland Road, Vancouver BC, V6B 2T6 (604) 674-6737

His company sells backup hardware and software for A.T. clones. He has written over a hundred letters to the readers of backup software reporting bugs and offering suggestions for improvements.

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## Laser Printers cont.

Most HP-type laser printers come only with one or sometimes a few typefaces; each version of the typeface is a font, so the specs would say that a printer has 14 fonts. Upon looking at a sample sheet, you'll see that they are all variations of the typeface Courier, for example. PostScript (see below) printers have a generous number of typefaces that are scalable to unlimited point sizes; the HP-type laser printer can have fonts added on in the form of cartridges.

**PPM** — Pages (Printed) Per Minute is the way to compare printer speed. This number, which can range from 5 PPM to 30 PPM, is accurate assuming that the printer is producing copies of the same page of text.

**Toner** — this is the laser printer's "ink." Sold in cartridges, most of which are refillable, the toner is an extra cost. In laser printers based on a Canon design, the laser cartridge is exactly the same kind of mechanism found in your Canon-type personal photocopier. They are an additional charge in the operation of your laser printer. These cartridges cost about \$150 and are good for about 1,000 pages. The exception is the new IBM LaserPrinter II, which prints 10,000 pages with a cartridge costing \$100.

**Draw** — this is the part in the laser printer which transfers the toner to the printer paper using heat and gentle

pressure; it needs regular replacement, once again like in a photocopier. Many owners of a laser printer is similar to maintenance of a photocopier.

**HPGL** — Hewlett-Packard Command Language is the programming language that the computer uses to communicate with the Hewlett-Packard type printer. It is one of the two most laser-printer languages, the others being PostScript. Printers that use HPGL are referred to as HP-compatible printers. However, some of these printers can be upgraded through special cartridges to PostScript-compatible printers.

**PostScript** — This is the programming language that the computer uses to communicate with PostScript printers, which are the most expensive type of printer because of their versatility and the variety of the 35 scalable PostScript typefaces, plus the easy access to thousands of other fonts available in software-based fonts. PostScript printers also excel at printing PostScript-based graphics produced by programs such as Adobe Illustrator, Corel Draw & Micrografx Designer.

**Scalable** — this term, used by typsetters and desktop publishers alike, means that the typefaces can be made to any size. This gives you the ability to create a range of sizes, from barely readable (5 point) to the eye-catching standard (30 point type) to screaming headlines (14-48-72 point type).

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### Introduction

The initial PC stand for Personal Computer, the collective name given to a wide range of computers. This article introduces you to personal computers, and assumes that you have no prior knowledge of them.

### A Little History

The first electronic computer was produced as long ago as 1946. It was called ENIAC, and comprised more than 18,000 vacuum tubes, the kind used in old-fashioned radio and television sets. As you can imagine it was a very large machine, occupying most of a whole building. It weighed 30 tons, which is about as much as 50 small cars. ENIAC was in use for about 10 years, but despite occasional use it could not do more than today's simple pocket calculator.

In 1975, the first home computer was launched. Among the first producers were such familiar companies as Apple, Commodore, and Tandy. And launched on the first computer aimed at both home users and small companies in 1976, and about a year later the first small business

computer, such as the Osborne 1 and Kaypro II, were launched.

A very significant year for the development of computers was 1981, when IBM launched its first personal computer. Since then, computers have developed at a fast clip. Today's personal computers are faster, have a much larger capacity, and cost only a fraction of a 1981 model.

A personal computer is a complete system which can be placed on your desk. It can perform a whole range of tasks at very high speeds.

Many companies adopted the standards set by the IBM PC to produce their own computers, which work in the same way as the IBM machines. These are often referred to as IBM compatible computers, or IBM clones. Both the IBM PC and its compatibles have undergone enormous development, with improvements being announced every few months. This has resulted in newer models with names such as the XT, AT, 286, 386, and PS/2. These different models are discussed later.

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### What Is a Computer, Really?

In simple terms, a computer is no more than an electrical appliance. Like your television, or furnace, it has been developed to be able to perform certain tasks.

For example, you can use your computer as a typewriter for writing letters, as a pocket calculator to balance your checkbook, or as a VCR/TV combo to display pictures and drawings. You can also use it to store telephone numbers, play games, produce technical drawings and develop commercially documents for printing. Computers can even be used in one profession from.

Just like any other electrical appliance, computers can and do break down and cause problems. However, they may sleep just when a mistake is blamed "on the computer." In most cases it's a human error that causes you to receive that notice from the phone company that you that unless you pay your outstanding bill for \$4,567,890.13, your telephone will be disconnected.

A computer is not some sort of supernatural, super-crafty, slightly machine-powered to take over the world. A computer can not think for itself, it can only follow instructions. It is not capable of suddenly deciding that it would like to have a nice vacation, or of feeling the desire to take a long vacation on some sunny island beach. It can, however, follow instructions and perform predictable tasks at an amazingly high rate: a million or so instructions per second.

Assume that you have a list of telephone numbers stored in your computer system, with a program, or predefined list of instructions, which can extract the right number for a given person. If you ask your computer what telephone number Al Pacino, Lincoln has, it will give you after a short delay, tell you that it doesn't find his number. It is not capable, however, of wondering directly that Lincoln was alive 20 years ago and does not, and did not, have a telephone.

If you ask your computer to print out 2+2=4, it will do so. Again, it is not capable of thinking for itself and telling you that 2+2 does not equal 4. It also can't refuse to print less. On the other hand, by giving the computer the right information it could, for example, calculate the wages for thousands of employees making company time a matter of seconds.

By giving a computer an appropriate set of instructions, it can very quickly perform a wide range of tasks. A computer is a very fast working, but completely stupid, machine.

### The Different Parts of a Computer

While their appearance varies, the basic parts which make up a personal computer are the same. All computers need some way of allowing the user to give instructions or information (keyboards), and some way of showing what's going on (monitor screen). Other important parts needed are a place in which information can be stored (diskette and disks), and the mechanism that can serve as a traffic cop and control the flow of information within the computer (system unit). You also need a means of making your data accessible to people who don't have a computer handy (printer).



### The Keyboard

The keyboard has a layout that's similar to a typewriter, but it has several extra keys.



A typical IBM-compatible computer

The keyboard is used to send instructions to the computer and to input required information or data. Many computers are slightly wary of pressing keys

because they do not understand what happens. They're worried that they can destroy the computer in some way if they press the wrong combination of keys. This is not the case, however.

### The Monitor

The monitor is rather like a television set, although it does not function in quite the same way. In display is the computer's way of showing you what's going on. It can also be referred to as the video display terminal (VDT), the video display unit (VDU), or simply to the screen. There is a third term, alphanumeric (CRT), which is often used synonymously with VDT and VDU. All of these terms are used to refer to the display unit on a computer.

There are many kinds of monitors, but the main difference is between monochrome monitors that only display images in varying shades of white, green, or gray, and color monitors that

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can reproduce the full range of pictures. A color monitor will often brighten up the true you spend working with your computer. On the other hand, a monochrome monitor costs less, is more compact and will often suffice for your needs.

The monitor is used to show information which your computer sends out each time a letter you've typed, the results of a calculation, or even a picture.

### The System Unit

The system unit is the central part of a computer. All other units, like the monitor and the keyboard, are connected to and controlled by this unit.

The system unit processes your keyboard inputs and controls the output to your monitor. It also processes instructions it's given and all relevant data for each task it performs. All calculations are done within the system unit.

### The Computer's Memory

An integral part of the system unit is the computer's memory, where text and numbers are stored. For example, a number can be stored in the computer's memory and remembered to be used in a multiplication operation.

There are two very different sorts of memory: ROM memory and RAM memory. These are described below.

### ROM Memory

ROM is a permanent memory. Data stored in ROM contains information necessary for your computer when you turn it on to ensure its correct performance. ROM stands for Read Only Memory, which means that you can never change its contents. Your computer can only read and use the information that is stored there. Information in ROM remains even when your computer is off.

### RAM Memory

RAM is a nonpermanent memory and it's the data that is stored temporarily while you are working with the computer. Temporary information is used as long as they are needed for a specific task, but they will disappear from RAM when the computer is turned off or when a different computer program is activated. RAM stands for Random Access Memory, which refers to the concept that data can be written to, and read from, this sort of memory at will.

### Memory Size

The size of your computer's memory is measured in bytes, or kilobytes. Each byte is the most basic character. For example, the word "Hello" since you see it would take up 37 bytes, not forgetting the blank and the end-of-line point. A kilobyte is 1024 bytes, and it's sometimes just called K or Kb.

The important thing, from the user's point of view, is the size of the computer's RAM-memory. Programs are loaded

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System 1988	\$325
System 1989	\$375
System 1990	\$425
System 1991	\$475
System 1992	\$525
System 1993	\$575
System 1994	\$625
System 1995	\$675
System 1996	\$725
System 1997	\$775
System 1998	\$825
System 1999	\$875
System 2000	\$925
System 2001	\$975
System 2002	\$1025
System 2003	\$1075
System 2004	\$1125
System 2005	\$1175
System 2006	\$1225
System 2007	\$1275
System 2008	\$1325
System 2009	\$1375
System 2010	\$1425

System 1988	\$325
System 1989	\$375
System 1990	\$425
System 1991	\$475
System 1992	\$525
System 1993	\$575
System 1994	\$625
System 1995	\$675
System 1996	\$725
System 1997	\$775
System 1998	\$825
System 1999	\$875
System 2000	\$925
System 2001	\$975
System 2002	\$1025
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System 1988	\$325
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System 2007	\$1275
System 2008	\$1325
System 2009	\$1375
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System 1988	\$325
System 1989	\$375
System 1990	\$425
System 1991	\$475
System 1992	\$525
System 1993	\$575
System 1994	\$625
System 1995	\$675
System 1996	\$725
System 1997	\$775
System 1998	\$825
System 1999	\$875
System 2000	\$925
System 2001	\$975
System 2002	\$1025
System 2003	\$1075
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System 2006	\$1225
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System 2008	\$1325
System 2009	\$1375
System 2010	\$1425

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System 1993	\$575
System 1994	\$625
System 1995	\$675
System 1996	\$725
System 1997	\$775
System 1998	\$825
System 1999	\$875
System 2000	\$925
System 2001	\$975
System 2002	\$1025
System 2003	\$1075
System 2004	\$1125
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into RAM, and larger programs require larger RAM. If your computer's RAM is too small, you will not be able to run some of the larger programs.

Most computers these days have 640K RAM, which is 640 kilobytes, i.e., about 640,000 bytes (as, more exactly, 655,360 bytes). Other computers still have less memory: 256K, or 112K, while newer computers may have 1 or 2 meg or 4M (million bytes) of RAM. It is possible to increase the size of the memory with additional circuit boards called *expansion cards* into your system's main.

#### Data Storage

One of the most important aspects of a computer is its capability to store and recall information. When you are creating a document, for example, the text is stored in RAM, but this means that all information disappears when you turn the computer off. You can, however, make a copy of that information on a floppy disk or hard disk. This allows you, at a later time, to recall the stored information and load it into your computer again. You can then extend, edit, or erase the document.

#### Floppy Disks

Floppy disks, sometimes referred to as *diskettes* or *diskies*, are small plastic cards covered with magnetic particles that are used for storing information. There are basically two types of floppy disks, 5.25" and 5.25" disks, which refer to the overall diameter of the disks or holders.

5.25" disk can store a certain amount of kilobytes of information, but this does not depend on the physical size of the disk.



• 5.25" disk can store 360K, 720K, or 1.44MB (1440 K)

• 5.25" disk can store 360K, or 1.2M

(Generally referred to as high density disks)

As an example, a 360K disk can store the equivalent of about 360 pages of printed text.

Floppy disks can be moved between computers, assuming that both computers are IBM compatible and have the same kind of disk drives. You can, for example, create a document on your computer at work, save a copy of that text on a floppy disk, transfer it home with your car, and use your own computer.

#### Disk Drives

The use of floppy disks requires a disk drive. This is a unit that reads and records information on floppy disks. It's usually mounted in the system unit, although it is possible to have a free-standing unit.

All computers have at least one such disk drive, and most have two. Units for 5.25" floppies are becoming more and more common, and you may see some PC's that sport a 5.25" disk drive that can read only 360K floppies, or a 5.25" unit that reads 360K, 720K, and 1.44MB disks. While every one is sure, it's likely that by now you're wearing both a belt and suspenders.

To use a floppy disk, you just insert it in the drive for the readable side. Most 5.25" units also require you to push a lever down or close a door to enable it to function properly.

#### Hard Disks

A hard disk is a rigid set of disks that are mounted permanently within the system unit.

Although it is possible to remove a hard disk drive and install it in another computer, it is very unusual to move hard disks around between computers. Having said this, if you wish, mentioning there are also portable hard disk drives, which use specially designed cases to make it easy to remove and reinsert them. A hard disk is a set of disks, with multiple read and write heads that allow it to store and access very large amounts of data very quickly. A small hard disk can store 20M of data, which is the equivalent of about 10,000 pages of text. Larger hard disks can store anywhere from 30 to 500 meg, and some



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A computer that has a hard disk is much better equipped than one that doesn't have a hard disk. Many larger programs now require a hard disk, and, since they operate three to ten times faster than a floppy drive, there are a lot of reasons. Once you've used disk for some length

of time, you'll never want to use a machine that doesn't have one again.

#### ABC For Disk Drives

Your computer will automatically give a name to each of the disk drives in your system. The letters A, B, C etc. are used. This is done so that it is possible to keep track of which drive the computer is working with.

• The first floppy disk drive is called drive A.

• The second floppy disk drive is called drive B.

• The first hard disk drive is called drive C, even if you don't have a floppy disk drive named B.

• Subsequent disk drives, whether hard

or floppy, (Remember our beta-and-suspender type suit?) are named D, E, F, etc.

#### Printers

Although a printer is not actually part of a computer, it's the most common addition to one. You need to create letters and other documents on your computer if you want to be able to get printed copies of them.

There are several types of printers. The cheapest and most common being the dot matrix printer.



The printing head of a dot matrix printer has a block of pins. These look like tiny nails and they create characters with a dot pattern by hammering the correct pins against a ribbon and the paper.

Another type of printer is the daisy wheel printer, which works like an ordinary typewriter. Characters are supplied on metal or plastic preformed wheels and these can be interchanged to produce different styles of type. Thus, a typical office might have a Letter Gothic font wheel whose results look like they were done on a typewriter, and a Script type wheel that gives a more elegant, cursive look. The print quality is better than a dot matrix printer, but a daisy wheel printer works much slower and is more expensive.

Users who are preparing documents that have to display the utmost in quality will use a laser printer, which gives sharp, crisp images both for text and pictures. However, these are many times more expensive than dot matrix printers and most often wheels. But they're quieter and do a better job than any other kind of printer.

Ask for printer work by shooting a line of ink onto the paper. The nearest inkjet printers are available at lower prices and produce results that are comparable in quality. Yet these printers don't cost more than most daisy wheels or heavy-duty dot matrix models. After problems such as clogging and limited types of paper stock have been worked out, look for these units to be the printers of choice for those that can't afford lasers.

#### Programs and

##### Programming Languages

Without instructions or commands, a computer will stand still. With an appropriate set of instructions, a computer can perform many tasks, both simple and complicated. Such a set of instructions is called a program. Programs are designed to do specific tasks. The following are the more common types of programs and what they do.



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<b>Word Processing</b>	creating texts
<b>Spreadsheets</b>	performing calculations and developing statistical models
<b>Databases</b>	storing and retrieving information
<b>Desktop Publishing</b>	creating brochures & camera-ready copy with text and graphics
<b>CAO</b>	generating complex engineering drawings
<b>Communications</b>	allowing your computer to communicate with others
<b>Graphics</b>	creating statistical displays
<b>Accounting</b>	doing invoicing, checkbook balancing, etc.

When creating programs, different programming languages can be used. The format user will not create programs, but will only use ready-made programs developed by professional programmers. When writing a program, it is not even apparent to the user which programming language has been used to create that program, but here is a list of the more common languages used with PCs to see you have heard these mentioned and wondered what they were:

- Basic
- Pascal
- C
- Assembly Language
- Prolog

There are in fact several hundred different languages. Each language has its own particular set of commands, and a set of rules on how each command can be used.

#### DOCS

DOCS short for Disk Operating System. It's a collection of programs that provide you with a set of commands designed to help you gain access to your hard or floppy disk, and perform some other basic routines. All computers must have such an operating system. When you start your computer, this operating system is automatically loaded into memory.

For example, DOS commands can be used to investigate the contents of a disk, to copy or delete files or to prepare a new floppy disk for use.

#### Files

Many different sorts of information can be stored on a floppy or hard disk. For example, a letter, a word processing program, a diagram, a game program, a programming language, or an address list can all be maintained on a disk. Each complete unit of information is called a file, and has its own unique name.

Files can consist of up to eight characters, followed optionally by a period and up to three more characters, for example:

TEXT  
LETTERS  
LETTERS.TXT  
CHISEL.DOC  
CHISEL.DOC

#### What Can a Computer Do?

We have already looked at the different tasks that a computer can perform. This section contains some more general information on the most common uses. First, however, here's a summary of the four most basic things a computer can do:

- receive information
- process information
- send out information
- store information

By information we mean text, numbers, pictures, and even electronic signals. It is the combination of these four processes, completed with the help of programs, which allow computers to be so versatile.

#### Writing

The most common use for a computer is writing. You can create letters and messages or write entire books. To write with a computer, you generally use a word processing program, although some other kinds of programs can also be used.

After you type in your text, you can use a copy on a disk. Texts are easily edited by inserting and deleting words, or moving sentences or full paragraphs around it with. When you make mistakes, you just correct them without ever having to start again, as would be necessary with a typewriter.

#### Drawing

You can use your computer to create diagrams, pictures, and technical drawings. This sort of work usually requires a large RAM-type memory and a hard disk.

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8	8,910	6,669	28	27,085	26,470
9	11,357	67,733	29	28,321	27,692
10	12,297	19,090	30	28,521	27,794
11	16,136	12,136	31	40,712	40,581
12	17,287	18,682	32	41,852	41,538
13	18,247	18,784	33	42,042	42,223
14	19,606	20,194	34	44,280	44,247
15	21,610	22,405	35	45,024	44,641
16	22,382	23,787	36	46,747	46,139
17	22,432	24,878	37	47,532	47,411
18	24,819	28,406	38	48,117	48,682
19	24,824	27,721	39	50,359	50,118
20	25,106	28,882	40	51,581	51,472
21	24,387	29,324	41	52,740	52,795
22	26,614	30,635	42	53,615	54,116
23	26,727	30,276	43	55,142	56,433
24	32,296	34,238	44	56,288	57,754

**FILE SERVER CONFIGURATION:** MT286 12MHz CWS, 2MB, 1.2MB floppy, 40MB 28MHz Harddisk, Monochrome Display, Enhanced Keyboard, 2 Parallel & 1 Serial Ports, Arnet Card  
Novell Network Operating System, File Servers under 8 users are installed as NON-DEDICATED file servers

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### Communications

Communications programs allow you to connect your computer to other computer systems. You can, for example, search for information in many of the available databases, or send and receive mail and files.

### Accounting

Many companies use computers for doing all of their accounting functions. Next to word processing, this is probably the most popular application for which personal computers are

used in the workplace. Some large corporations which have giant mainframe systems to do their "official" accounting, many middle managers maintain their own accounting systems on PCs so that they can better keep track of the funds they have spent and have yet to receive.

### Graphical Presentation

Another group of programs is aimed at those wishing to produce graphics presentations of statistical results. These are typically produced in the form of charts

or overhead transparencies that can be used at meetings.

### Industrial Production

Some companies use specialized computer systems which control production lines in factories, and programs which help to design products. The latter are called CAD programs, which stands for Computer Aided Design or Computer Aided Design.

### Playing Games

Just click one of the mouse's buttons and the mouse will appear at that point. If you're moving the cursor around your screen a lot (as when you're drawing), the mouse is a lot faster than trying to maneuver the cursor using the arrow keys on the computer.

A mouse can also be used with word processing and spreadsheet programs, and it's required by several of the better desktop publishing programs.

### Calculating

A computer can perform calculations very easily and quickly. It takes just a matter of seconds for a computer to count up to 1 million, a task which a mortal human would have great difficulty doing at all.

Spreadsheet programs help you to represent numerical data for calculations. The numerical grid that a spreadsheet produces is sometimes called a model. Results from one part of the model can be used in other parts. By changing certain entries, you can test different assumptions and produce the "what-if" models prized by financial analysts and business school professors.

### Database

Database programs allow you to systematically organize and store information on — for example — companies, products, or collectors items such as records, wine, or stamps. The information is immediately retrievable, and can give you useful lists and analyses. In addition, the better data base management programs are sophisticated than they can be used to do almost anything a computer can do. Increasingly they're being used in place of traditional programming languages to do a wide variety of tasks.

### Desktop Publishing

Desktop publishing is the art of producing newsletters, manuals, books, and the like on your computer. Such programs allow you to combine text and pictures, and to define the layout and style used.

You can produce complete works or camera-ready originals that will be sent to a printer. Their most renowned feature is called WYSIWYG, which stands for "What You See Is What You Get." This refers to these programs' ability to show multiple flows, different print sizes and even proportional spacing on the computer screen so that the author can tell exactly what the finished printed copy will look like.

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Most people sell by a game program in some time and some of you will get selected. There are many different sorts of games, adventure games, action games, flight simulators, chess, and sports games to name but a few.

## Kind of Computers

While all computers can essentially do the same things, the specialized versatility with which they run depends on what type of processor they're built around. The processor is the part of the computer which controls other parts. There are four main processors used in IBM PCs and compatibles. In order of effectiveness, with the slowest and most limited first, they are the 8085, 80286, 80386, and 80486.

An ordinary PC machine has an 8086 processor and no hard disk. It is a comparatively slow machine by modern standards and it can't run many of the newer programs that require hard disks.

An XT machine has a hard disk, but in other respects it is like an ordinary PC.

An AT machine has an 80386 processor which makes it quicker and more powerful than a PC or XT. These machines are almost always equipped with a hard disk and they can run almost all of the programs available today.

Finally, 386 and 486 machines have even better 386 and 486 processors. These are the machines power users dream about. A 386 with 2 megabytes of RAM and a 128 megabyte hard disk is not considered unusual. Also, these machines are specifically designed to multitask, which means to run more than one program at a time. Thus, multitasking, a power user can be working on a letter with the word processing program while, in the background, his computer is also charging away at a statistical analysis that might take several hours to complete.

IBM has also branched its PS/2 computer series, which is somewhat different in design from the other models, but comes in models that use all 3 of the processors. Thus, their PS/2 Model 25 uses an 8086 processor (a close relative of the 8088) while their PS/2 Model 40 uses an 80386. The PS/2's are mostly compatible with existing programs but use a different bus architecture and add-in card slots.

Another area in which computers differ slightly is their display capabilities.

For instance, a monochrome monitor can cost as little as \$799 for one VGA design, meaning that it's possible to add and not produce pictures or graphics on its screen, or over \$2,000 if it's a high resolution display publishing design with a 39" screen that can clearly reproduce 3 facing pages of newspaper classified ads at their actual size.

In between these extremes are the popular VGA design which are used to be almost everywhere. While these are inexpensive, they can use changes of their basic parts in order to reproduce a wide range of colors. Also, they

can reproduce graphic images and they only cost a little more than the bargain basement VGA models. Thus there can be used in place of more expensive and bulky color monitors where standard graphics capability is needed.

Among the color monitors, the choice is equally wide. At the low end are the VGA design which produce a full range of colors in what are called VGA monitors. About 2 years ago these were the state-of-the-art. Now, due to their relatively poor resolution, they're barely considered acceptable.

On the next rung up the ladder are the EGA designs. These are finer in resolution than the VGA models and can produce even a wider spectrum of colors. For most people today, they're quite satisfactory.

Finally, we come to the VGA standard. These are the finest in resolution and shading that it's easy to monitor standard presentations done on them with video cards or film.

Just close by themselves are the LCD displays used on laptop computers. These usually emulate or make believe that they're VGA monitors, but they're really monochrome displays that use technology to reproduce the various colors much the same way the VGA monochrome displays do. The color LCD displays have little advantage in resolution over the standard, but they're called superhigh resolution, and the building of a laptop computer, the laptop laptop computer, the display are fairly good. Nevertheless, using these displays for more than about an hour at a time can be considered cruel and unusual punishment.

The display portion of a computer is called its graphics system. This usually consists of a circuit board, called an adapter card, which is placed in your computer's system unit, and the appropriate monitor. Sometimes, it also includes special software programs called a driver that's used to ensure that the images generated by a program appear properly on the screen.

There are now monitors and adapter cards that can automatically switch between graphic modes. These are called monochrome monitors and adapters, and they provide you with almost limitless assurance that what you buy today won't be obsolete tomorrow.

When the time comes to buy a monitor, there are a few things you should know. First, that depends on your intended use and your budget. Today there are millions of ads in ads are happily using inexpensive VGA monochrome systems and slightly more expensive VGA color systems.

But, if you can spend a bit more, try to go for an EGA or monochrome color system or — if willing and desktop publishing are your game — a monochrome desktop publishing monitor. And if you're not so object, by all means go for VGA or one of these high-resolution 20" desktop publishing monitors. After all, you deserve them!

CONTINUED ON PAGE 56

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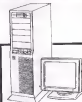
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## Paradigm Design



## PageMaker 4.0

CONTINUED FROM PAGE 38

board commands, but even of the numeric cursor controls already know well that all Command-numbers are not equal.

This minor shortcoming doesn't alter the fact that the story editor, with its various, associated to a large loop in capability for PageMaker users. This feature alone makes the US\$156 upgrade price a great bargain. (Extended technical support clinics can buy the upgrade for US\$139.)

**More on styles and text handling**  
PM4.0 offers a host of other long-awaited text-handling features. In previous versions, one of the most annoying tasks was trying to properly align the left-hand margin to the tabs/indents line with the actual margin on the layout. It now keeps this view already aligned. Hoosier! Styles have always been paragraph-based. Many Word users have wondered why most paragraph features were not included — such things as rules, keep-together, orphans and widow controls, spacing and so on. It's all here. The "reverse graphics" feature allows artwork to be moved from boxes to match the same way as in Word. Placed this way, a graphic moves around in lockstep with the copy with which it is placed. Adding the Option key to a Command-V

paste accomplishes a kind of step-and-repeat function similar to 3D from here. The paste superimposes a copy exactly on top of the original. If that copy is moved and option-paste is repeated, another copy is placed that distance away again. Nifty.

### Other features

The improvements and additions in this version, are legion. Here's a partial list: table of contents and index generation, letter-width scaling, type rotation (previously limited to 90-degree movement), tracking, type size as much as a point up to 600 points (instead of the previous 127), document length up to 500 pages, book feature, linking of art and text for optional automatic updating as files are changed (great for workgroups), much improved on-line help, many new keyboard shortcuts and automatic highlighting of certain types of layout errors.

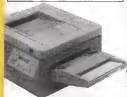
One other new item is the Story Importer, which lets you save and load directly import stories in other PM publications. Imported stories can be placed directly or via the Story Editor for cleanup.

### Old bugs squashed

All earlier versions of PageMaker had the annoying and expensive table table of

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# The next Big Thing?

by George Beckett

## Forward: Into the future

*Predicting the future is always dangerous. The would-be visionary risks falling flat on his proverbial "old hat," or worse, representing ideas up like a many pine in the sky. The following items are the author's pick for "next to be very popular."*

## Criticism

Today's ultra-high-tech consumer electronics shows, you are sure to be bewildered (literally) by strange variety of electronic musical instruments, "semi-friendly" appliances, cell phones, fax and assorted gadgetry, each claiming to be "the next big thing." Everyone has a different opinion and everybody has a different set of criteria. With that in mind, a few musings will give us a place to start narrowing down the field.

1) It must be a revolution, not just evolution. Arguably, even MIDI was merely evolutionary, but as part of the digital revolution, it stands as a good example of technology that forever changed the way many musicians compose and perform.

2) It must be a price and/or performance breakthrough. CD's were a good example of a performance leap through laser precision represented a



price/performance breakthrough that spawned an entirely new market: the desktop publishing industry.

3) The potential market must be horizontal, meaning that a wide segment of the population should be able to take advantage of it. MIDI is probably not a very good example, since the MIDI interface is not often used or used by non-musicians. Nonetheless, it can be used by non-musicians, just as a player piano could be played like a portable game. Telephones, CD's, home video decks, cassette decks and TV's all are more horizontal by comparison.

Just in 1988 was the year when every respectable business had to have a fax machine, and 1989 is likely to be remembered as the "Year of the Cellular explosion." 1990 will probably be remembered for DAT and other low-cost digital audio recorders.

Is (Digital Audio Tape) DAT a revolution? I think not. While the CD and digital home stereo market is tremendously successful, DAT is only incrementally better-sounding than a good-quality analog tape deck, and all tape-based systems suffer from the same problems. The media is easily damaged and is not reasonably secure in the way that a disk is. When a read/write error does hit the non-market (and it won't be long), DAT will be lost.

A Digital Audio Disk (da, they don't call it DAD) system that is rather remarkable in the digital Tools system from Digital Design for Macintosh (DL/50 or II series) and Atari Mega ST computers. The basic idea is simple: Audio is digitally recorded at CD quality (44.1 kHz) by the Digital Signal Processor (DSP) chip and is stored on the hard disk, or multiplexed in real-time by the audio-coding portion of the program. In con-

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system with certain MIDI sequencer software programs (currently limited to Opcode's SoundVision on the Mac and Glue's Notator on the Atari ST), the software controls MIDI equipment to create the electronic portions of the music. Then when an acoustic instrument or voice plays, the Sound Tools DSP "locks in" and plays the audio tracks stored on the hard disk. Only a couple of years ago, the type of thing cost hundreds of thousands of dollars. At around \$15,000 for a minimum setup, Sound Tools isn't exactly cheap, but for a full-fledged digital audio editing and recording environment, Sound Tools is a bargain. Are you hooked? Are you kidding? Let's keep looking.

I predict that a few years from now, something like a video version of Sound Tools (let's call it Video Tools) will become available. It will require serious advances in storage technology to handle the incredible amount of data that tomorrow's high-resolution TV will display, but the result will be something like this.

Your entire TV show will be digitally recorded, and you will be able to edit out commercials, neatly insert flip-in to say what's in the show, new on-air programs simultaneously and a variety of other special effects. Ho-hum, right?

How about time compressing that 15-hour movie to 2 hours, without affecting the pitch of the voices or music. The critics who complained about Ted Turner's colorization of black-and-white movies will be going wild when they start seeing that. But if you are considering the negative aesthetic implications, wait!

With digital time compression (already used in video production to speed up, for example, a 30-second commercial into 20.5 seconds), the "lip-slip" in time expansion, TV networks will be able to dramatically compress the broadcast, and your "smart TV" will be able to decompress the show into its normal length. Instead of completely altering the pacing of a director's masterpiece, your TV will stretch it back out to its correct length, or any amount of time that you have to view it.

Is the hypothetical Video Tools unit ridiculous? Perhaps. Must we build it? I doubt it. For the foreseeable future, the amount of memory required to store an hour of full-frame video is prohibitively (and increasingly) expensive. Only the most die of video production companies are likely to have such tools for quite some time.

Neither is FAX technology a revolution, although it is necessary of the era. It is a amazingly popular and represents a performance breakthrough over the postal system. Unfortunately, FAX is revolutionary with respect to the idea of electronic mail, which computer users have been using for years with much better results.

Until Email systems become as ubiquitous as telephones, fax will better serve

the average folks who don't have Email from their email. In many respects, it is because PC-based Email systems are so clumsy and hard to use that a new system like fax ever became a viable alternative. Someday, an inexpensive and widely-compatible Email network will prove that sending a low-resolution bitmap via FAX isn't the best way.

A more likely course of progression for future technologies or formats that transcend business/machine interface already, in the personal computer industry, we have seen the dominance of Cuipter. User interfaces and emphasis on ease of use.

As voice input, optical character recognition and handwriting recognition replace manual data entry as the information creation/offers/entry, more and more people will be able to communicate accurately and quickly with their computers. As higher-bandwidth telecommunications networks are installed across the nation, the boundaries between computers, telephones, cellular networks and cable TV will become increasingly blurred. With this integration, we will see the true implications of the information age, today's buzzwords — "Hypertext" and "Multimedia" — will become go-to-be and installed into the cultural mainstream. With this integration, "transparent" computers will be so simply as the information they represent.

## GLOSSARY of TERMS

**CD-Quality** a 44.1 kHz (or better) recording. See also PCM.

**Hertz** or **Hz** waveform cycles per second. The human ear can normally hear from 20Hz to 20kHz (kilohertz).

**Hypertext** a system of cross-referencing text or other data stored in a computer. Apple's HyperCard is an obvious Hypertext application.

**MIDI** Musical Instrument Digital Interface, a standard method of transmitting information between different brands of electronic musical instruments. Technically, MIDI is a bus (50 KHz bandwidth) serial communications protocol.

**Modems** a telecommunications device. So-called because it Modulates digital information into sound for telephone transmission, then the receiving computer (DEM) demodulates the sound back into digital form.

**Multimedia** interactive computer-generated graphics, animations and sound sometimes integrated with CD-ROM or laserdisc video to create interactive educational or other presentations.

**Sequencer** a recorder for MIDI data, either a stand-alone "box" (hardware) or a computer program (software).

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### WHAT'S A PC? CONTINUED FROM PAGE 44

There is, of course, an extreme simplification of a market flooded with computers and accessories.

#### Points To Remember

Parts of a Computer and Accessories:	Disk drive
Keyboard	Printer
Monitor	Programs
System unit	OS/2
Floppy disk	Mouse
Hard disk	

#### A Computer's Four Functions:

- Entering information, Processing information, Storing and Information, Retrieving information

#### Also:

- A computer is a very fast, but stupid, electrical appliance
- It is the multitude of programs that

allow the computer to be used for so many different tasks.

• Each unit of information, stored on a disk, is called a file

*Editor's note: It may interest some of our readers to learn how this article was reproduced from the book **PC Crash Course**. We scanned the book's pages line at a time onto an Apple scanner, using **OmniPage Optical Character Recognition (OCR)** software to optically recognize the character shapes. **OmniPage** successfully read the text, tables, footnotes and indexes, creating a text file which we then loaded into a word processing program for final cleanup. Only minimal editing was required. One of the thousands of characters successfully recognized, only one or two characters were missed, such as a lower case "a" mistakenly identified as "n" and a few "0" misread as "O". Not bad for a stupid electrical appliance!*

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